Internet Of Things	Image Processing	Sensors	EPM
A IOT approach to crack detection, reporting and navigation Station platform is specified using IOT	To capture the live video	Automatic crack Detection Automatic track changing Number of people counting	To reduce the speed of train and stop the train within the range specified

RAILWAY TRACK CRACK DETECTION TECHNIQUE					
Sl No	year	Paper name	Basic concept	advantage	disadvantage
1.	2009	Passenger Monitoring Model for Easily Accessible Public City Trams/Trains	public transportation, train, tram, passenger monitoring, passenger control, RFID distance Reading, ticket control, RFID ticket inspection.	It's possible to travel cross country with a single public transportation card, using Transport systems of several transport operators.	Applicable only for passenger monitoring
2.	2013	Way-side wheel crack detecting using arrayed ultrasonic probes	It will detect the wheel crack by using ultrasonic rays	It will eliminate the failure risks of wheels,	No cost effective
3.	2011	Crack Detection in Railway Axle Using Horizontal and Vertical Vibration Measurements	Investigations are carried out to assess the possible use of vibration measurements to identify	effect of various sources of disturbance, namely wheel out-of	High harmonic distortion

Sl No	year	Paper name	Basic concept	advantage	disadvantage
			the presence of a fatigue crack in railway axles	roundness, can be more easily dealt with.	
4.	2012	Robust Railway Crack Detection Scheme (RRCDS) Using LED-LDR Assembly	robust solution to the problem of railway crack detection utilizing	cost effective	In this the range IR sensor is very less
5.	2015	Automatic Railway Track Crack Detection System	addressing the issue by developing an automatic railway track crack detection system integrating an infrared red (IR) crack sensing module	crack is detected	It is not fully automatic
6.	2015	An Enhanced Crack Detection System for Railway Track	To detect the railway crack	Obstacle detection	This process take a more time
7.	2016	Review on railway track crack detection using ir transmitter and receiver	The defect information can be wirelessly transferred to railway safety management centre using a GSM module	Cost of the unit is less when compared to other , No fire hazard problem due to over loading	It cost is very high, sometimes signal receive not properly
8.	2017	Automotive Crack Detection for Railway Track Using Ultrasonic Sensors	Ultrasonic sensor is used to detect the crack in the railway track by measuring distance from track to sensor.	The auto crack detection method is more efficient in the technical field . Quick response is achieved	IR Sensor range IS .7 to 300 micrometers
9.	2017	Localization of an Unmanned Aerial Vehicle for Crack Detection in Railway Tracks	Localization of a UAV and how it can be applied for detecting cracks in a railway track using the concepts of image processing.	It find exact location of the crack	Technique used has a long process were the time interval is not sufficient

Sl No	year	Paper name	Basic concept	advantage	disadvantage
10.	.	Safety verification	RFID based	Distance	While

#	Year	Title	Technology	Advantages	Disadvantages
	2012	for train traffic control		traveled is effectively used	distance scanning alone will not be able to determine the actual number of free riders
11	2006	Autonomous Rail Track Inspection using Vision Based System	Image processing, rail track inspection	automatically find clips in video sequences and thereafter recognise	Disconnected pixels which are impossible to link together as a cohesive clip
12	2007	Condition monitoring of railway track and driver using in-service vehicle	GPS	Gps is used to analysis the vehicle vehicle services	This is totally based on data base
13	2005	*Research on alarm system of railway crossing based on GPS and GPRS*	GPS and GPRS	LCD display module and serial port operation module.	fare is equal to that of the voice calls, this is much vanished technology
14	2012	a robotic system for non-destructive evaluation of rcf cracks in rails using an acfm sensor	ACFM, RCF, NDE, Robotics	utilising ultrasonic, eddy current which was potential to improve the quality of RCF crack	autonomously to inspect the rail tacks was difficult due to wide range
15	2017	Rail crack detection based on the adaptive noise cancellation method of EMD at high speed	*acoustic emission; adaptive noise cancellation; empirical mode decomposition*	crack signals in varied speed conditions even with high speed	Due to the speed limit of test rig, the verified maximum speed is 124 km, it fail to detect the crack after it exceeds 124km
16	2015	Unmanned Level Crossing Controller and Rail Track Broken Detection System Using IR Sensors and Internet of Things Technology	GSM modem, GPS module , IR transmitter and Receiver, Internet of Things technology	Unmanned gate crossing controller system used FM communication system and its having high performance	the level crossing at a distance of 1km. so there will be lot of time required

SI No	year	Paper name	Basic concept	advantage	disadvantage
17	2014	Reliability Methodology and Theory for Development of Novel Railway Signalling Systems	radio-based, formal methods,	systems with high safety requirements such as Level-Crossing Control (LCC	All in one is proposed system so this much complex
18	2016	Formal verification of movement authorities in a Automatic train control system	track-side Radio Control Blocks (RBC)	RBC needs to consult the interlocking logic	RBC is to mediate between trains in terms of their Movement Authority (MA)

SI No	year	Paper name	Basic concept	advantage	disadvantage
19	2013	Evolution of Railway Track Crack Detection System	GPS module; GSM modem; Ultrasonic distance meter.	The presented system helps to detect the flaws in the rail track using ultrasound testing method	The certain proportion of the signal energy propagates over to the other medium, at the same time the remaining energy gets reflected back
20	2017	Automatic Water level monitoring and Seat availability details in train using Wireless Sensor Network	Float water sensor, IR sensor, UART, Wireless Mesh Sensor Network	Water management is maintained by sensor. The IR sensor is used to check the seat availability	It requires low power supply for functioning and the performance isvery high.
21	2017	Wireless Sensor Network for Real Time Monitoring and Controlling of Railway Accidents	Wireless Sensor Networks, Energy consumption, IR sensor.	implementing real time monitoring and automatic control of different parameters related to railway	Power consumption has to reduce in railway boogie as well as in tunnel
22	2012	Android Suburban Railway Ticketing with GPS as Ticket Checker	Android, SQLite, Cloud Database; ASR; QR code	E-ticket facility ,enabling reuse and replacement of	QR codes before the user enters or leaves the station,

				components.	where the user can have access which is risk in ticket booking
23	2016	Train Collision Avoidance System by Using RFID	RFID Tag, RFID Reader, GSM Module, Surveillance system based on ARM Controller and Android Device.	the main control room or driver before collision happen	it is not that much safer as the lot of collisions and accidents occur due to improper communication among the network, wrong signaling
24	2017	Novel Approach for Smart Indian Railways	Digitalization, Smart Railways, Aadhar card, Smartphone, Identity Verification.	The main objective of this paper is to employ a mobile application through which passengers can access various ticketing options in a user-friendly and efficient manner	This paper brings in the implementation of the Aadhar card, in the process of booking the tickets and the efficient identity verification of the passenger using the biometric data.